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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/733,487	12/08/2000	Sergej Lopatin	9090-0185	2468

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EXAMINER

DOUGHERTY, THOMAS M

ART UNIT	PAPER NUMBER
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2834

DATE MAILED: 04/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/733,487

Applicant(s)

LOPATIN ET AL.

Examiner

Thomas M. Dougherty

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 3/17/03.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 15-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7, 9-13, 15 and 17-20 is/are rejected.
- 7) ☒ Claim(s) 5, 6, 8 and 16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claim 2 is rejected under 35 U.S.C. 102(b) as being anticipated by Okawa et al. (US 5,459,371). Okawa et al. note (claim 4) an electromechanical drive or sensor element having a layer structure having a plurality of piezoelectric ceramic layers in which mutually facing surfaces of directly adjacent piezoelectric ceramic layers are metallized by application of a metal coating, so that an electrode layer is formed by the metallized surfaces with which contact can be made via an electrical connector. Note that recitation of how the device is actually made however carries no patentable weight since the method of forming a device (e.g. diffusion welding) is not germane to the issue of patentability of the device itself. *In re Brown* 173 USPQ 685, *in re Fessman* 180 USPQ 324.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okawa (US 5,459,371) in view of Williams (US 2,479,987). Given the invention of Okawa et al. as noted above, they fail to show a groove provided in at least one of the two mutually facing surfaces of the piezoelectric ceramic layers and at least partially holds the electrically connector.

Williams shows (figs. 1 and 3) an electromechanical drive or sensor element having a layer structure, which comprises a plurality of piezoelectric layers (10, 11); an electrode layer (15, 17) which is arranged between two mutually facing surfaces of directly adjacent piezoelectric layers (10, 11), and an electrical connector (24) for making electrical contact with the electrode layer (15, 17); in which the connector (24) is likewise arranged and is passed out between the two mutually facing surfaces of the piezoelectric ceramic layers (10, 11). He also shows a groove (21) provided in at least one of the two mutually facing surfaces of the piezoelectric ceramic layers (10, 11) and at least partially holds the electrical connector (24). He doesn't explicitly state use of a ceramic material.

It would have been obvious to one having ordinary skill in the art to employ a piezoelectric ceramic material in the device of Williams at the time the his invention was made since this is a well known material in piezoelectric layer or stack structures as is shown by Okawa.

Claims 1, 3, 4, 7, 9, 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (JP 4-361575) in view of Williams (US 2,479,987). Matsumoto shows (fig. 2) an electromechanical drive or sensor element having a layer structure, which comprises a plurality of piezoelectric ceramic layers (1); an electrode layer (2) which is arranged between two mutually facing surfaces of directly adjacent piezoelectric ceramic layers (1), and an electrical connector (21) for making electrical contact with the electrode layer (2); in which case the connector (21) is likewise arranged and is passed out between the two mutually facing surfaces of the piezoelectric ceramic layers (1). The drive or sensor element having piezoelectric ceramic layers composed of PZT material (col. 3 line 23).

Matsumoto does not show his connector arranged between and passed out between his two mutually facing surfaces of piezoelectric ceramic layers. He fails to show a groove provided in at least one of the two mutually facing surfaces of the piezoelectric ceramic layers and at least partially holds the electrical connector. He doesn't note the use of his device as an acceleration sensor. He doesn't note his piezoelectric ceramic layers composed of a material having a Curie temperature of more than 400°C. Matsumoto doesn't show piezoelectric ceramic layers composed of a material selected from the group consisting of $\text{Na}_{0.5}\text{Bi}_{4.5}\text{Ti}_4\text{O}_{15}$ and $\text{Bi}_3\text{TiNbO}_9$.

Williams shows (figs. 1 and 3) an electromechanical drive or sensor element having a layer structure, which comprises a plurality of piezoelectric layers (10, 11); an electrode layer (15, 17) which is arranged between two mutually facing surfaces of directly adjacent piezoelectric layers (10, 11), and an electrical connector (24) for

making electrical contact with the electrode layer (15, 17); in which the connector (24) is likewise arranged and is passed out between the two mutually facing surfaces of the piezoelectric ceramic layers (10, 11). He also shows a groove (21) provided in at least one of the two mutually facing surfaces of the piezoelectric ceramic layers (10, 11) and at least partially holds the electrical connector (24). He doesn't explicitly state use of a ceramic material. He doesn't note use of his device as an acceleration sensor. He doesn't note his piezoelectric ceramic layers composed of a material having a Curie temperature of more than 400°C. Williams doesn't show piezoelectric ceramic layers composed of a material selected from the group consisting of $\text{Na}_{0.5}\text{Bi}_{4.5}\text{Ti}_4\text{O}_{15}$ and $\text{Bi}_3\text{TiNbO}_9$.

As Matsumoto notes use of a claimed material it is regarded as inherent in his device that the temperature requirement is met. Additionally, the Applicants' originally had this claim dependent on the claim which cites PZT indicating that PZT meets this desired characteristic. Note however that as the Applicants' themselves claim no specific material, although examples are provided but not definitively claimed, this feature is regarded as a goal of the invention unsupported by the claimed structure.

It would have been obvious to one having ordinary skill in the art to employ a piezoelectric ceramic material in the device of Williams at the time the his invention was made since this is a well known material in piezoelectric layer or stack structures as is shown by Matsumoto.

The intended use of the structure as an acceleration sensor does not carry patentable weight. It has been held that a recitation with respect to the manner in which

a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

Regarding use of piezoelectric ceramic layers composed of a material selected from the group consisting of $\text{Na}_{0.5}\text{Bi}_{4.5}\text{Ti}_4\text{O}_{15}$ and $\text{Bi}_3\text{TiNbO}_9$, it would have been obvious to one having ordinary skill in the art at the time either invention was made to employ any of these materials, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (JP 4-361575) and Williams (US 2,479,987) further in view of Aggarwal et al. (US 6,274,388). Given the combined invention of Matsumoto and Williams as noted above, said combination fails to show electrode layers composed of a metallic material having a Curie temperature of more than 400°C or electrode layers comprised of bismuth-titanate. Aggarwal et al. note use of electrodes composed of a metallic material having a Curie temperature of more than 400°C which is comprised of bismuth-titanate (col. 9, ll. 40-42). It would have been obvious to use electrodes composed of a metallic material having a Curie temperature of more than 400°C such as electrode layers comprised of bismuth-titanate as is taught by Aggarwal et al. since this is a known material for this function.

Claims 12, 13 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (JP 4-361575) and Williams (US 2,479,987) further in view of

Samuelson (US 2,933,628). Given the combined invention of Matsumoto and Williams as noted above, it is not clear that the connectors which are in the form of wires are composed of a metallic material having high-temperature stability at more than 250°C and which are composed of a material which contains silver and contains stainless steel, or of such a material which contains a nickel alloy. Samuelson notes (col. 1, ll. 48-50) use of silver wire in a piezoelectric device and he notes that the device is rugged. It would have been obvious to one having ordinary skill in the art to employ the silver lead wires of Samuelson in the combined device of Matsumoto at the time of his invention in order to take advantage of the ruggedness that the material provides.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsumoto (JP 4-361575) and Williams (US 2,479,987) further in view of Butcher et al. (US 5,382,865). Given the combined invention of Matsumoto and Williams as noted above, said combination does not disclose a device to be used as a level limit switch and that it includes a drive and sensor element. Butcher shows an electromechanical drive and sensor element having a layer structure, which comprises a plurality of ceramic layers (1); an electrode layer (2) which is arranged between two mutually facing surfaces of directly adjacent ceramic layers (1), and an electrical connector (connected to 2) for making electrical contact with the electrode layer (2); in which the connector is likewise arranged and is passed out between the two mutually facing surfaces of the piezoelectric ceramic layers. The drive and sensor element are not piezoelectric though they exhibit the piezoelectric effect. It would have been obvious to one having ordinary skill in the art at the time the invention was made to employ the combined invention of

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Matsumoto and Williams in the device of Butcher since the ceramic material has known and predictable characteristics and is readily available. The intended use of the structure, that being a level limit switch does not carry patentable weight. It has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex parte Masham*, 2 USPQ2d 1647 (1987).

Allowable Subject Matter

Claims 5, 6, 8 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Direct inquiry concerning this action to Examiner Dougherty at (703) 308-1628.

tmd
tmd

April 9, 2003

Thomas M. Dougherty

THOMAS M. DOUGHERTY
PRIMARY EXAMINER
GROUP 2834

2003-04-09